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10/613,116	07/03/2003	Ambarish Goswami	23085-08025	4209

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HONDA/FENWICK
SILICON VALLEY CENTER
801 CALIFORNIA STREET
MOUNTAIN VIEW, CA 94041

EXAMINER	
NGUYEN, HUONG Q	
ART UNIT	PAPER NUMBER
3736	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/613,116	GOSWAMI, AMBARISH	
	Examiner	Art Unit	
	HELEN NGUYEN	3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-33 and 42-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-33 and 42-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the amendment filed 12/21/2007. Claims 23, 42, and 43 are amended. Claims 45-47 are news. The submitted drawings are acknowledged. **Claims 23-33 and 42-47** are pending and under prosecution.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 23-26, 28-30, 32-33, and 42-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al (*An Investigation of Kinematic and Kinetic Variables for the Description of Prosthetic Gait using the ENOCH System*) in view of Hershler et al (*Angle-Angle Diagrams in the Assessment of Locomotion*).

4. In regard to **Claims 23**, Oberg et al disclose a method for quantifying asymmetry of joint angles of two limbs during a movement comprising:

determining a first set of data that comprises angles of a joint of a first limb as the first limb performs movement, wherein the first limb is a leg, the joint is a knee, and the movement is gait (p.43 col.2; p.44);

determining a second set of data that comprises angles of a joint of a second limb as the second limb performs a similar movement, wherein the second limb is the second leg, the joint is

the knee, and the movement is gait (p.44), wherein the two limbs comprise the first limb and the second limb;

synchronizing the first set of data and the second set of data, wherein even though Oberg et al do not explicitly disclose synchronizing the data, all data collection necessarily includes synchronization of some sort, and in the instant case, due to the nature of the bilateral data obtained, it is necessary to synchronize the left and the right side data for proper collection and analysis;

generating a cyclogram best seen in Figure 5 (p.46) based on the synchronized data (p.45 col.1);

wherein the cyclogram provides a means to evaluate asymmetry of joint angles (i.e. knee) of the first limb and the second limb (p.45 col.1 bottom).

5. However, Oberg does not disclose determining a value of a characteristic of the generated cyclogram to quantify the asymmetry. Hershler et al disclose determining a value of a characteristic of a generated cyclogram such as area and perimeter as an effective means of statistical analysis for gait diagnosis such as asymmetry (p.111, 123). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Oberg et al to include determining a value of a characteristic of the generated cyclogram as taught by Hershler et al as an effective means to statistically quantify the asymmetry.

6. In regards to **Claim 24**, Oberg et al disclose the first limb is part of the one body and the second limb is part of the same body (p.44 col.1).

7. In regards to **Claim 26**, Oberg et al disclose the first limb a leg (p.44 col.1).

8. In regards to **Claim 28**, Oberg et al disclose the movement comprises one or more cycles, wherein the measured gait is repeatable and thus cyclic.

9. In regards to **Claim 29**, Hershler et al disclose the characteristic of the generated cyclogram is an area of the generated cyclogram (p.111).

10. In regards to **Claim 30**, Hershler et al disclose the characteristic of the generated cyclogram is an orientation of the generated cyclogram (p.111).

11. In regards to **Claim 32**, both Oberg et al and Hershler et al disclose comparing data against a reference or baseline. Hershler et al disclose comparing the calculated value, such as area, to a corresponding calculated value of a baseline movement (pg.110), wherein all comparisons require at least two sets of data, at least one of which is designated as the baseline, depending upon the nature of the comparison. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Oberg et al as modified by Hershler et al such that the determined value is compared to a value of the characteristic of the cyclogram representing a baseline movement to facilitate effective quantitative analysis.

12. In regards to **Claim 33**, Oberg et al disclose the baseline movement is a perfectly symmetrical movement (p.45 col.1 bottom).

13. In regards to **Claim 42**, Oberg et al disclose a system for quantifying asymmetry of joint angles of two limbs during a movement comprising:

a first determination module, i.e. light emitting diode placed on one leg, configured to determine a first set of data that comprises angles of a joint (knee) of a first limb as the first limb performs the movement (p.44 col.1);

a second determination module, i.e. light emitting diode placed on the other leg, configured to determine a second set of data that comprises angles of a joint (knee) of a second limb as the second limb performs a similar movement, wherein the two limbs comprises the first limb and the second limb;

a synchronization module, i.e. within minicomputer (p.43 col.2) configured to synchronize the first set of data and the second set of data, wherein even though Oberg et al do not explicitly disclose synchronizing the data, all data collection necessarily includes synchronization of some sort, and in the instant case, due to the nature of the bilateral data obtained, it is necessary to synchronize the left and the right side data for proper collection and analysis and is thus accomplished by a synchronization module above;

a generation module, i.e. minicomputer (p.43 col.2) configured to generate a cyclogram based on the synchronized data, best seen in Figure 5;

wherein the cyclogram provides a means to evaluate asymmetry of joint angles (i.e. knee) of the first limb and the second limb (p.45 col.1 bottom).

14. However, Oberg does not disclose a third determination module to determine a value of a characteristic of the generated cyclogram to quantify the asymmetry. Hershler et al disclose a determination module to determine a value of a characteristic of a generated cyclogram such as area and perimeter as an effective means of statistical analysis for gait diagnosis such as asymmetry (p.111, 123). Therefore, it would have been obvious to one of ordinary skill in the

art at the time the invention was made to modify the invention of Oberg et al to include a third determination module to determine a value of a characteristic of the generated cyclogram as taught by Hershler et al as an effective means to statistically quantify the asymmetry.

15. In regards to **Claim 43**, Oberg et al in combination with Hershler et al disclose a method for quantifying asymmetry of joint angles of two limbs during a movement comprising determining a first and second set of joint angle data that comprises positions of a first and second limb respectively, as both limbs perform a movement, synchronizing the first set and the second set of data as explained above, generating a cyclogram based on synchronized data, and determining a value of a characteristic of the generated cyclogram to quantify the asymmetry of the joint angles of the first and second limb, as elaborated in the rejection of **Claim 23**. However, Oberg et al as modified by Hershler et al do not disclose said method provided on a computer program product including instructions on computer readable medium.

16. Hershler et al disclose determining a value of a cyclogram such as area, previously described above. Furthermore, Hershler et al also disclose a computer program product, including instructions on computer readable medium, written in Fortran IV language to automate the calculation of a value, such as area, based upon sets of data (pg.117-118). Thus, it is said that Hershler et al teaches automating a method analogous to the method disclosed by Oberg et al as modified by Hershler et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to automate the method of Oberg et al as modified by Hershler et al using a computer program product comprising instructions on computer readable medium, as taught by Hershler et al, to automate the analysis process and make it more efficient.

17. In regards to **Claim 44**, Oberg et al disclose the joint of the second limb corresponds to the joint of the first limb (both are knee joints), best seen in Figure 5.

18. In regard to **Claims 45-47**, Oberg et al necessarily disclose the synchronized data represents the first limb and the second limb performing their movements in phase, which is done by realigning the first set of data and the second set of data by associating a first angle in the first set of data with a second angle in the second set of data if the first angle and the second angle each refer to a corresponding event in the movement, wherein due to the nature of the bilateral gait data collected from each limb, it is necessary that the first and second sets of data of both the first limb and the second limb would be "synchronized" to refer to a corresponding event in the walking movement to enable proper data analysis.

19. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view of Hershler et al.

20. Oberg et al as modified by Hershler et al disclose the method rejected above wherein the first limb is part of one body but does not disclose the second limb part of a different body. However, Oberg et al also disclose a comparison of gait data from normal subjects as well as amputees (p.44 col.2). Thus, it is said that Oberg et al disclose comparisons between two different subjects. Therefore, it would have been obvious to one of ordinary skill in the art to modify the method of Oberg et al as modified by Hershler et al to include comparisons with other people, as taught by Oberg et al, wherein said comparisons would translate into gathering data for a first limb that is part of one body and a second limb that is part of a different body, to

further enhance the gait analysis by including data gathered from different relevant bodies in addition to data gathered from the same body.

21. **Claim 27** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view Hershler et al, further in view of Kolich (US Pat No. 6290658).

22. Oberg et al as modified by Hershler et al disclose the method rejected above but do not disclose the first limb comprising an arm. Kolich teaches that proper arm movement is important for proper form during walking or gait, thus providing motivation to include an arm in the analysis of gait (Col.1, line 28-54). Therefore, it would have been obvious to one of ordinary skill in the art to modify the method of Oberg et al as modified by Hershler et al to include the first limb comprising an arm, as taught by Kolich, to further enhance the gait analysis by taking into account the effects of arm movement.

23. **Claim 31** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view of Hershler et al, further in view of Goswami (*A New Gait Parameterization Technique by Means of Cyclogram Moments: Application to Human Slope Walking*).

24. Oberg et al in combination with Hershler et al disclose calculating a characteristic of the generated shape, wherein the generated shape is a cyclogram, as motivated by the reasons above. However, Oberg et al in combination with Hershler et al do not disclose that characteristic as a minimum moment magnitude. Hershler et al also disclose calculating a value from a cyclogram as a means of analysis (pg.111), indicating that there are numerous ways to quantify shape (pg.124).

25. Goswami discloses calculating the moment magnitude of a cyclogram or angle-angle diagram for shape characterization (pg.3). Although Goswami does not explicitly disclose the calculation of the minimum moment magnitude, it is obvious that any calculation allows for ranges between the minimum and maximum. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Oberg et al as modified by Hershler et al, to calculate the minimum moment magnitude as the characteristic of the cyclogram, as taught by Goswami, to provide another effective method for quantifying the shape.

26. **Claims 23-26, 28-30, 32-33, and 42-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view of Hershler et al, further in view of Barrey et al (WO 01/56470, also see US Pat No. 6895341).

27. In regard to **Claims 23 and 42-43**, Oberg et al in combination with Hershler et al disclose the invention as claimed as elaborated in the above corresponding claims. However, Oberg et al and Hershler et al do not explicitly disclose a synchronization module configured to synchronize the first set of data and the second set of data. Barrey et al teach that cycles of gait motion from a first and a second set of data are synchronized to correspond to motions of a first (right) and a second (left) limb (Col.9: 32-42 from US Pat) to effectively allow analysis of the data. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Oberg et al as modified by Hershler et al to include a synchronization module configured to synchronize the first set of data and the second set of data

and then subsequently generate a cyclogram based on the synchronized data as taught by Barrey et al to effectively allow the analysis of gait data obtained from a first and a second limb.

28. In regard to **Claims 24-26, 28-30, 32-33, and 44**, please see the corresponding rejections above.

29. In regard to **Claims 45-47**, Barry et al disclose the synchronized data represents the first limb and the second limb performing their movements in phase, which is done by realigning the first set of data and the second set of data by associating a first angle in the first set of data with a second angle in the second set of data if the first angle and the second angle each refer to a corresponding event in the movement, wherein due to the nature of the bilateral gait data collected from each limb, it is necessary that the first and second sets of data of both the first limb and the second limb would be "synchronized" to refer to a corresponding event in the walking movement to enable proper data analysis.

30. **Claim 27** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view Hershler et al and Barrey et al, further in view of Kolich as rejected above.

31. **Claim 31** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oberg et al in view of Hershler et al and Barrey et al, further in view of Goswami as rejected above.

Response to Arguments

32. Applicant's arguments with respect to claims 23-33, and 42-47 have been considered but are moot in view of the new ground(s) of rejection.

33. In regards to Applicant's arguments that Oberg et al do not disclose synchronizing the data, it is noted that all data collection and analysis includes data synchronization of some kind, and thus Oberg et al necessarily disclose said synchronizing as claimed and discussed above. Furthermore, it would have also been obvious to one of ordinary skill in the art to perform such synchronization due to the bilateral nature of the first and second data set to enable proper data analysis of the first and the second limb, as also elaborated above.

Conclusion

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HELEN NGUYEN whose telephone number is (571)272-8340. The examiner can normally be reached on Monday - Friday, 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on 571-272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. N./
Examiner, Art Unit 3736

/Max Hindenburg/
Supervisory Patent Examiner, Art Unit 3736